CLAIMS

what is claimed is:

1. On a computing machine, a method of converting a number representing a game arrangement into a symbolic representation of the game arrangement, wherein the game arrangement is specified by a unique combination of positions and symbols associated with a particular game, the method comprising

receiving the number representing the game arrangement;

for a given position or symbol associated with the game arrangement,

(a) setting the given position or symbol to a particular value of the position or symbol and calculating the number of ways to place the remaining free positions or symbols available beyond the given position or symbol,

(b) using the calculated number of ways to place in a comparison with the received number representing the game arrangement, and

(c) from said comparison, determining whether the particular value of the given position or symbol appears in the symbolic representation of the game arrangement; and

setting one or more symbols or positions of the symbolic representation from the determination made in (c).

2. The method of claim 1, further comprising

determining from the comparison that the particular value of the given position does not appear in the symbolic representation of the game arrangement;

incrementing the particular value of the position or symbol; and

performing (a) – (c) on the incremented particular value of position or symbol.

3. The method of claim 1, further comprising

repeating (a) – (c), with newly incremented particular values, until determining that the particular value of the given position or symbol does appear in the symbolic representation of the game arrangement;

choosing a second given position or symbol associated with the game arrangement; and

performing (a) – (c) for the second position or symbol associated with the game arrangement.

4. The method of claim 1, further comprising subtracting the calculated number of ways to place from a current game arrangement number that is either (i) the number representing a game arrangement or (ii) a number that has been derived from the number representing a game arrangement.

5. The method of claim 4, wherein the number that has been derived from the number representing a game arrangement was derived by subtracting previously calculated number of ways to place for other particular values of the given position or symbol.

6. The method of claim 1, wherein the number of ways to place is calculated with a permutation function, an exponential function, or a choose function, depending on how the particular game is classified.

7. The method of claim 6, wherein the particular game is classified based on at least one of the following: (i) whether the arrangement of symbols is position-dependent and (ii) whether a given symbol can appear more than once in the game arrangement.

8. The method of claim 1, wherein the particular game is a poker game, a slot game, keno, or checkers.

9. The method of claim 1, wherein the computing machine is a gaming machine.

10. The method of claim 9, further comprising displaying the symbolic representation of the game arrangement on the gaming machine.

11. The method of claim 1, further comprising retrieving the number representing the game arrangement from a game history storage location on a gaming machine.

12. The method of claim 1, further comprising retrieving the number representing the game arrangement from a stored list or table of possible game arrangements when a player initiates a game on a gaming machine.

13. The method of claim 1, wherein the number of ways to place is calculated with a software-coded function or look-up table, depending on how the particular game is classified.

14. A machine readable medium on which is provided program instructions for converting a number representing a game arrangement into a symbolic representation of the game arrangement, wherein the game arrangement is specified by a unique combination of positions and symbols associated with a particular game, the program instructions comprising

receiving the number representing the game arrangement;

for a given position or symbol associated with the game arrangement,

(a) setting the given position or symbol to a particular value of the position or symbol and calculating the number of ways to place the remaining free positions or symbols available beyond the given position or symbol,

(b) using the calculated number of ways to place in a comparison with the received number representing the game arrangement, and

(c) from said comparison, determining whether the particular value of the given position or symbol appears in the symbolic representation of the game arrangement; and

setting one or more symbols or positions of the symbolic representation from the determination made in (c).

15. The computer program product of claim 14, further comprising the following program instructions:

determining from the comparison that the particular value of the given position does not appear in the symbolic representation of the game arrangement;

incrementing the particular value of the position or symbol; and

performing (a) – (c) on the incremented particular value of position or symbol.

16. The computer program product of claim 14, further comprising the following program instructions:

repeating (a) – (c), with newly incremented particular values, until determining that the particular value of the given position or symbol does appear in the symbolic representation of the game arrangement;

choosing a second given position or symbol associated with the game arrangement; and

performing (a) – (c) for the second position or symbol associated with the game arrangement.

17. The computer program product of claim 14, further comprising program instructions for subtracting the calculated number of ways to place from a current game arrangement number that is either (i) the number representing a game arrangement or (ii) a number that has been derived from the number representing a game arrangement.

18. The computer program product of claim 17, wherein the number that has been derived from the number representing a game arrangement was derived by subtracting previously calculated number of ways to place for other particular values of the given position or symbol.

19. The computer program product of claim 14, wherein the number of ways to place is calculated with a permutation function, an exponential function, a choose function, a software-coded function, or a look-up table, depending on how the particular game is classified.

20. The computer program product of claim 19, wherein the particular game is classified based on at least one of the following: (i) whether the arrangement of symbols is position-dependent and (ii) whether a given symbol can appear more than once in the game arrangement.

21. The computer program product of claim 14, wherein the particular game is a poker game, a slot game, keno, or checkers.

22. The computer program product of claim 14, further comprising program instructions for displaying the symbolic representation of the game arrangement on a gaming machine.

23. The computer program product of claim 14, further comprising program instructions for retrieving the number representing the game arrangement from a game history storage location on a gaming machine.

24. The computer program product of claim 14, further comprising program instructions for retrieving the number representing the game arrangement from a stored list or table of possible game arrangements when a player initiates a game on a gaming machine.

25. On a computing machine, a method of generating a number representing a game arrangement from a symbolic representation of the game arrangement, wherein the game arrangement is specified by a unique combination of positions and symbols associated with a particular game, the method comprising

for a given position or symbol associated with the game arrangement,

(a) setting the given position or symbol to a particular value identified for said position or symbol in the symbolic representation of the game arrangement,

(b) calculating a number of sequentially arranged game arrangements skipped over to reach a game arrangement having the particular value set at the given position or symbol, and

(c) summing the number calculated with a current game arrangement number;

repeating (a), (b), and (c) for each given position or symbol available in game arrangements for the particular game;

returning the current game arrangement number as the number representing the game arrangement for the symbolic representation; and

using the number representing the game arrangement during game play on a gaming machine.

26. The method of claim 25, further comprising setting the current game arrangement number to zero at the beginning of the method.

27. The method of claim 25, wherein (b) comprises

for a series of position or symbol values less than the particular value, calculating a number of ways to place the remaining free positions or symbols available beyond the given position or symbol and summing the calculated numbers of ways to place to give the number of sequentially arranged game arrangements skipped over.

28. The method of claim 25, wherein using the number representing the game arrangement during game play comprises determining which cards to hold in a poker hand.

29. The method of claim 25, wherein using the number representing the game arrangement during game play comprises storing the number representing the game arrangement in a game history memory location.

30. The method of claim 27, wherein the number of ways to place is calculated with a permutation function, an exponential function, or a choose function, depending on how the particular game is classified.

31. The method of claim 30, wherein the particular game is classified based on at least one of the following: (i) whether the arrangement of symbols is position-dependent and (ii) whether a given symbol can appear more than once in the game arrangement.

32. The method of claim 25, wherein the particular game is a poker game, a slot game, keno, or checkers.

33. The method of claim 25, wherein the computing machine is the gaming machine.

34. The method of claim 25, wherein the computing machine is a computer external to the gaming machine.

35. The method of claim 25, wherein the number of ways to place is calculated with a software-coded function or look-up table, depending on how the particular game is classified.

36. A machine readable medium on which is provided program instructions for generating a number representing a game arrangement from a symbolic representation of the game arrangement, wherein the game arrangement is specified by a unique combination of positions and symbols associated with a particular game, the program instructions comprising

for a given position or symbol associated with the game arrangement,

(a) setting the given position or symbol to a particular value identified for said position or symbol in the symbolic representation of the game arrangement,

(b) calculating a number of sequentially arranged game arrangements skipped over to reach a game arrangement having the particular value set at the given position or symbol, and

(c) summing the number calculated with a current game arrangement number;

repeating (a), (b), and (c) for each given position or symbol available in game arrangements for the particular game;

returning the current game arrangement number as the number representing the game arrangement for the symbolic representation; and

using the number representing the game arrangement during game play on a gaming machine.

37. The computer program product of claim 36, further comprising program instructions for setting the current game arrangement number to zero at the beginning of the method.

38. The computer program product of claim 36, wherein instruction (b) comprises the following program instructions:

for a series of position or symbol values less than the particular value, calculating a number of ways to place the remaining free positions or symbols available beyond the given position or symbol and summing the calculated numbers of ways to place to give the number of sequentially arranged game arrangements skipped over.

39. The computer program product of claim 36, wherein using the number representing the game arrangement during game play comprises determining which cards to hold in a poker hand.

40. The computer program product of claim 36, wherein using the number representing the game arrangement during game play comprises storing the number representing the game arrangement in a game history memory location.

41. The computer program of claim 38, wherein the number of ways to place is calculated with a permutation function, an exponential function, a choose function, a software-coded function, or a look-up table, depending on how the particular game is classified.

42. The computer program product of claim 41, wherein the particular game is classified based on at least one of the following: (i) whether the arrangement of symbols is position-dependent and (ii) whether a given symbol can appear more than once in the game arrangement.

43. The computer program product of claim 36, wherein the particular game is a poker game, a slot game, keno, or checkers.

44. A method of developing an algorithm for interconverting between a number representing a game arrangement and a symbolic representation of the game arrangement, wherein the game arrangement is specified by a unique combination of positions and symbols associated with a particular game, the method comprising

ordering positions available in the particular game;

ordering symbols available in the particular game;

identifying or developing a WaysToPlace function for use in the algorithm, based on a classification of the particular game; and

arranging the WaysToPlace function for iterative calculation to thereby define at least a portion of the algorithm.

45. The method of claim 44, wherein the particular game is classified to identify or develop the WaysToPlace function based on at least one of the following: (i) whether the arrangement of symbols is position-dependent and (ii) whether a given symbol can appear more than once in the game arrangement.

46. The method of claim 44, further comprising providing the algorithm on a gaming machine for use in game plays.